depending upon a supposed orbital motion of the stars in the plane of the Milky Way. This term did not appear, however, to have a real existence. The stars were divided into four groups depending upon the amount of the annual proper motion, and the four solutions gave very accordant results in R.A. for the position of the apex of the solar system. The declination appeared less certain, but great confidence has been attached to the results of this particular investigation. Dr. Stumpe's talents as a computer have been generally recognised. He took some share in the calculations of the star places in the Bonn Zone Catalogue under Prof. Deichmuller, and afterwards, on repairing to Berlin in 1891, he was engaged in the preparation of the Zone Catalogue 15°—20° declination. Since that time he has assisted Dr. Auwers in the many researches with which that astronomer has been connected, and who loses in him an able co-operator and a devoted assistant.

NOTES.

AT the ordinary meeting of the Royal Society last week, Sir Nathaniel Lindley, Master of the Rolls, was balloted for and elected a Fellow under the special clause in the statutes which permits the admission of members of the Privy Council; and similarly, to-day it is proposed to ballot for Sir Herbert E. Maxwell. It may be recalled that Sir N. Lindley is a son of the late Dr. John Lindley, the famous botanist.

THE original lists of the subscribers to the Indian Section of the Pasteur International Memorial (British Division) have just been received from Surgeon-Major-General Cleghorn. On glancing down the columns where the profession of the donor is given, the first thing which strikes us is the very varied character of the generous contributors to this fund. We find, for example, members of the Indian Civil Service, the Indian Medical Service, officials in the opium department, in the salt department, forest officers and a number of native forest students, members of the legal profession (including a number of native pleaders), merchants (one of whom mentions having been a patient of Pasteur's), chaplains, medical and other missionaries, numbers of jailors and warders, an indigo planter, locomotive superintendents and assistants, the principal of a theological seminary at Insein in Burma, the superintendent of a Government lunatic asylum, civil apothecaries, bankers, revenue clerks, collectors and magistrates, numbers of "private gentlemen" (Indian), the Governor of Madras, the head-master of a missionary school, &c.; whilst the Army in India has also furnished a large contingent of subscribers. In one district we find a note saying that the inhabitants "are not willing to subscribe to the Pasteur Memorial, but will willingly subscribe towards the Pasteur Institute." The manner in which the fund has been supported in India not only reflects the greatest credit upon the subscribers, but also upon those who have so efficiently organised its collection.

AT the Royal Institution last week, Prof. E. Ray Lankester, F.R.S., in commencing his course of eleven lectures on "The Simplest Living Things," remarked that though of late years it had become the custom to use the term physiology as meaning the study of the chemical and physical properties of living things in contradistinction to the study of their structure, yet fifty years years ago it denoted their general study, and the Fullerian Professorship of Physiology—the chair to which Prof. Lankester has just been appointed—was intended for the furtherance of physiology in the broad sense now given to the term biology. It is proposed in a subsequent course to continue the consideration of the simplest living things by a detailed examination of the structure and activities of the different kinds bacteria, and to give an outline of the science of bacteriology.

MR. CORNELIUS N. HOAGLAND has given to the Hoagland Biological Laboratory of Brooklyn a mortgage for 24,000 dollars.

ELECTRICITY is to be substituted for steam as the motive power of the elevated railroad system of New York City. Contracts for the new equipment have just been signed.

M. J. O. E. PERRIER, member of the section of anatomy and zoology of the Paris Academy of Sciences, has been elected *membre libre* of the Academy of Medicine, in succession to Dr. Magitot.

THE Council of the Sanitary Institute have accepted an invitation from the Lord Mayor and City Council of Birmingham to hold its seventeenth congress and exhibition in that city in September next.

AFTER sixteen years as professor of geography at the Royal University of Turin, Prof. Guido Cora has resigned his charge, in order to devote himself entirely to scientific researches in geography and related sciences. He has transferred his residence (and the direction of his periodical *Cosmos*) to Rome (Via Goito, 2).

THE death is announced of M. Bazin, the French engineer whose "roller-boat" has on several occasions been referred to in these columns.

THE unpublished manuscripts of the late Prof. Julius Sachs, of Würzburg, have, in accordance with his wish, been placed in the hands of Prof. Noll, of Brünn.

PROF. A. S. KIMBALL, for many years professor of physics in the Worcester Polytechnic Institute, and the author of a number of important papers on the subject of friction between sliding surfaces, as well as of other original contributions to physical science, died on December 2, 1897, after a long illness.

DR. DAWSON WILLIAMS, assistant editor of the *British Medical Journal*, who has been connected with the editorial department of the *Journal* for seventeen years, and has on many occasions discharged the duties of acting editor, has been appointed editor in succession to the late Mr. Ernest Hart. Mr. C. Louis Taylor, who has been sub-editor for the last eleven years, has been appointed assistant editor.

A CURIOUS incident in natural history is related by a correspondent of the *Aberdeen Journal* (January 22). While ferreting rabbits on the bank of a small stream, Mr. J. Robson, a gamekeeper who has for about sixty years been out with rod and gun between the Derwent and the Thurso rivers, states that on the ferret coming out of a hole and running up the edge of the stream, a trout leaped out of the water and fell on the gravel in front of the ferret. The ferret attacked the fish, and after considerable difficulty succeeded in capturing it. Mr. Robson sententiously adds: "I then creeled them both."

THE fifty-first annual general meeting of the Institution of Mechanical Engineers will be held in the rooms of the Institution of Civil Engineers, Westminster, on Thursday and Friday, February 10 and 11. The retiring president, Mr. E. Windsor Richards, will induct into the chair the president-elect, Mr. Samuel W. Johnson. The paper on "Mechanical Features of Electric Traction," by Mr. Philip Dawson, read at the last meeting, will be further discussed, and the following papers will be read and discussed, as far as time permits:—First Report to the Gas Engine Research Committee: description of apparatus and methods and preliminary results, by Prof. F. W. Burstall; steam laundry machinery, by Mr. Sidney Tebbutt.

THE death is announced from Halle of Dr. Ernst Ludwig Taschenberg, well known as an entomologist. Born in 1818, he was appointed in 1856 Director of the Zoological Museum at Halle. His entomological studies, begun after his connection with the Museum, were devoted at first to the hymenopterous fauna of Middle Europe, on which his chief work was "Die Hymenopteren Deutschlands" (1866). These writings were largely compendiums of existing information, and his chief claim to recollection rests on the production of several valuable handbooks on the injurious insects of Germany, such as his "Entomologie für Gärtner und Gartenfreunde" (1871); "Forstwirthschaftliche Insektenkunde" (1874); "Praktische Insektenkunde" (1879-80); and "Die Insekten nach ihrem Schaden und Nutzen" (1882). His "Praktischen Insektenkunde," in particular, published in five parts, is an excellent account of the characters, bionomics and economy of all the more important injurious insects of Middle Europe, arranged according to systematic position, and not, as is generally the case, in relation to the nature of the damage they occasion. In the absence of any satisfactory general text-book on the subject published in this country, this work is indispensable to any serious study of injurious insects in Great Britain, as well as in Germany. Save for a single paper on Hymenoptera, which appeared in 1891, Dr. Taschenberg published nothing on entomology during the past fifteen years.

For some time past the weather has been unusually mild for the time of year, and the returns received by the Meteorological Office show that higher temperatures have occurred in parts of the British Islands during the past week than in any January during the last twenty-five years at least. At Wick a temperature of 60° was recorded on the 19th, which is 3° higher than any previous record in this month, and in other parts of Scotland almost equally high readings were observed. The *Weekly Weather Report* of the 22nd inst. showed that the temperature was 7° or 8° above the mean in all districts except the north of Scotland, where it was 5° above the average.

The current-intensity of a lightning flash is difficult to determine, since we cannot well send it through a galvanometer and determine the magnetic field produced by it. But there are other lines along which we can approach the problem, as has recently been indicated by F. Pockels in the jubilee number of *Wiedemann's Annalen*. It has been noticed that some rocks found on the surface of the earth exhibit a magnetisation which is quite out of keeping with the earth's ordinary magnetism. The probability is at once suggested that their magnetisation may be due to lightning discharges in the neighbourhood. Herr Pockels cut some rods out of the basalt of the Winterberg in Saxony which showed such irregular magnetism, and found on testing them that the permanent magnetism they possessed could only be imparted to them by a current of at least 2900 amperes passing along the surface of the rock. If the discharge did not pass there, it must have been a good deal stronger, so that this is only a minimum value. Later on, he cut some basalt in the neighbourhood of a tree which had been damaged by lightning, a circumstance which gave him some clue to the distance at which the current passed. The value then obtained for the current strength of the lightning was 6500 amperes.

M. Armand Viré contributes to the *Revue générale des Sciences* for December 30, a highly interesting paper on subterranean fauna, which he has made the subject of extended study, both in the catacombs of Paris and in the large caves of the Jura, the Pyrenees, and the central plateau of France. A number of illustrations are given of the cæcal forms of arthropods and crustacea discovered by M. Viré, several of which have been described as new species, though the author has endeavoured to refer them to existing forms which have become modified by environment. Most of these cave inhabitants are characterised by the extraordinary development of their tactile and auditory organs, their antennæ, legs, and even their bodies being covered with fine hairs highly sensitive to the slightest disturbance. In searching for transitional types, M. Viré has met with a fair measure of success. In the case of *Asellus aquaticus*, both normal and subterranean forms exist, the latter presenting marked differences in their antennules. The author considers that the subterranean genus of beetles, *Anophthalmus*, is probably referable to *Trechus*, and that the new species, *Niphargus virei*, is possibly a modified form of *Gammarus*. Finally, M. Viré suggests the desirability of an extended series of experiments on these transitional forms, with a view of ascertaining how far they tend to revert to the normal types on being restored to light.

The transformation of Röntgen rays by metals forms the subject of a note contributed to the Société Française de Physique, by M. G. Sagnac (*Bulletin*, No. 106). When such rays are incident on a metal surface they are not perceptibly reflected, but the superficial layer transforms them into secondary rays capable of producing photographic impressions, of exciting fluorescent screens, or of discharging electrification. These secondary rays differ from ordinary Röntgen rays in that they are freely absorbed by aluminium, the absorption giving rise to a further kind of tertiary rays, still more readily absorbed by aluminium. M. Sagnac suggests that the secondary and tertiary rays may be intermediate between true Röntgen and Lénard rays.

An important memoir on the magnetic properties of tempered steel has been communicated to the Société d'Encouragement pour l'Industrie Nationale, for publication in their *Bulletin*. The authoress, Madame Sklodowska Curie, discusses which are the best kinds of steel for the construction of permanent magnets. In the first series of experiments, bars and occasionally rings of steel were heated in an electric furnace the spiral current of which at the same time furnished the magnetic field. It was found that steel does not take the temper unless heated to a temperature superior to that at which its magnetic properties change. Among various steels, those containing 1·2 per cent. of carbon were found best suited for the construction of permanent magnets. Madame Sklodowska Curie has also considered the presence of different metals in steel. While these do not usually modify the residual magnetisation, they often considerably ncrease the coercitive field, *i.e.* the field required to cause demagnetisation; the addition of tungsten or molybdenum furnishing the best steel for magnets. The paper concludes with an examination of the stability of magnetisation in bars, the effect of blows and of variations of temperature being specially considered. The greater the coercitive field the less is the effect of blows; heating to 200° considerably affects good magnetic steel, even a temperature of 100° is detrimental, while the best permanent magnets are made by heating the steel to only 60° and partially demagnetising it after having magnetised it to the point of saturation.

The *Journal de Physique* for January contains, in addition to abstracts, papers by M. A. Leduc, on the densities, molecular volumes, compressibility, and dilatation of gases at different temperatures and at mean pressures; by M. H. Pellat, on the variation of energy in isothermal transformations considered with special reference to electric energy; by MM. Pellat and Sacerdote, on contact phenomena; and by M. G. Sagnac, on diffraction of plane waves by slits and gratings.

An atlas of the currents of the Pacific Ocean has just been published by the Hydrographer of the Admiralty from information collated and prepared in the Meteorological Office. This is the third volume of current charts for the great oceans that has recently been issued in the same way, with the view of providing the navigator with the best available information. The sources from which the observations were obtained being (1) logs received in the Meteorological Office, mainly from the Mercantile Marine, from 1854-96; (2) logs and remark books of H.M. ships from 1830-94. Although charts for each month have been prepared, it has been thought advisable to publish four only, viz. for the representative months January, April, July and October, as the amount of information is still deficient in many places unfrequented by ships. The charts show the average direction of the currents and the maximum and minimum velocity which may be expected. In the case of the Japan Stream, which runs almost uninterruptedly to the north-eastward, the velocity sometimes reaches from seventy to seventy-five miles a day. It is seen that there is generally a south-easterly current down the west coast of North America, and a northerly current along the coast of South America, and that these two streams are deflected near the equator to form the equatorial current.

WE have just received the general report of the operations of the Survey of India Department for the year ending September 30, 1896. The report states that the most interesting and important feature of the year's work is the completion of the telegraphic determination of the difference of longitude between Greenwich and Karachi, undertaken with the view of obtaining a definite value for the longitude of Madras (see p. 284). The tidal observations appear to have been regularly and successfully prosecuted. Self-registering gauges are maintained at thirteen stations, and during the year a new tidal observatory was erected at Suez, while preliminary surveys have been made at Perim, Port Albert Victor, and Porbandar, with the view of adding these places to the list of stations. The error of predicted time of high and low water at those open coast stations which are provided with self-registering gauges did not exceed fifteen minutes in about 65 per cent. of the observed tides, while on about 95 per cent. the predicted height did not differ from the observed by more than eight inches. At the riverain stations, the same amount of accuracy in both time and height was reached in 57 and 60 per cent. respectively, but the time of low water was much less certain than that of high. The bulk of the volume is taken up with details concerning the progress of the various surveys, and the preparation of the results for public use. These surveys, of various kinds, extend over a wide area, and bring home to us the immense amount of work accomplished by the department. Here one may read some details of the delimitation of the frontier between British territory and Afghan, and a few pages further on trace the work of demarcation of the Burma-Siam boundary. The interests of the department are wide enough to embrace, and the machinery sufficiently elastic to produce, either a series of sun pictures or illustrations of the action of cobra poison on the blood.

THE remarkable shark, *Chlamydoselachus anguineus*, whose tricuspid teeth and other structural peculiarities render it unique among recent fishes, has been so rarely obtained that the discovery of a specimen in the Varanger Fjord is a matter of considerable interest. Up to the year 1889 only thirteen specimens of this reanimated Devonian fossil had been secured by naturalists, and all of these came from Japanese waters—the last abode of so many primitive oceanic types. In 1889, however, the Prince of Monaco captured a small *Chlamydoselachus* off Madeira, and now Mr. R. Collett provides a description of an unusually fine and complete specimen caught off the coast of Norway rather more than a year ago. His memoir contains a history of all previous records, and is illustrated by an excellent photograph of the fish taken soon after its capture.

THE reason why spiral growths in nature should sometimes take one direction and sometimes another, is often difficult to determine. Mr. George Wherry recently described a few of these puzzles in nature growth before the Cambridge Medical Society. Referring to shells he pointed out that the ancient whelk, now in fossil form (*Fusus antiquus*) is usually left-handed, while in the present generation of common whelks the shell is always right-handed. Nevertheless, among the right-handed shells there is occasionally found a specimen of a modern whelk of the ancestral type going a contrary curve. What was there at work in the whelk when the soft young creature began life to give it the twist to left or right? and why are the ancient whelks found going the "wrong" way? Similar questions may be asked of other natural torsions. For instance, spiral growth in plant-life is a subject of bewildering interest, and though worked at by so many great observers, from John Hunter to the Darwins and De Candolle and the modern Germans, there are still many phenomena wholly unexplained. The hop and honeysuckle take the form of a left-handed screw; the majority of twining plants, however, twine like a right-handed screw—*i.e.* from the left below to the right above when the plant and its support are looked at from the exterior. A twining plant will make its spiral curves without a support if the terminal be merely steadied by a thread and weight over a pulley so that the apex of the shoot is drawn vertically upwards, but a free horizontally sweeping shoot will make no spiral turns at all. There are also other spiral growths which present many points of interest, and sometimes the value of a twist in a particular direction can be easily understood. Mr. Wherry points out that the horns of the koodoo, for example, are twisted in a right-handed spiral on the left side and a left-handed spiral on the right side. The result is that when the animal rushes through the bush the horns thrown back act as a wedge and drive aside the branches as the koodoo dashes through the thicket. With regard to hoofs and nails, it is astonishing under the influence of moisture and absence of friction how these organs will curve and grow spirally.

THE cause of death by electric shocks has been experimentally investigated by Prof. T. Oliver and Dr. R. A. Bolam, who describe their methods and results in the *British Medical Journal*. The increasing employment of electricity within the last few years has demonstrated, by the accidents to workmen engaged in its generation and distribution, that danger is involved. Two opinions are held as to the cause of death in such cases, viz.: (1) that death is due to failure of the respiratory centre (d'Arsonval); (2) that it is due to sudden arrest of the heart's action. From the appearance presented by the internal organs after death, some physiologists have maintained that death is due to asphyxia. But other evidence suggests that death is not due to failure of the respiratory centre. In the experiments carried out by Prof. Oliver and Dr. Bolam, an alternating current was used, and death appears to have resulted from heart rather than respiratory failure. Whilst in some of the experiments death seemed to be due to contemporaneous cessation of the respiration and heart's action, yet in most there was ample demonstration that the organ first to be arrested was the heart, for breathing was observed to continue rhythmically for a brief period, and then irregularly and feebly before stopping. There is reason to believe that only in the case of very high voltages with currents considerably above the potential usually required to kill the animal is there simultaneous stoppage of heart and respiration. Primary cessation of the heart's beat is, without doubt, the general rule, while under no circumstances did the authors succeed in causing primary arrest of respiration followed by failure of the heart. It follows from this that resuscitation in apparent death from electric shock is made much more difficult than if the fatal result were brought about by respiratory failure. With reference to these experiments, Dr. Lewis Jones calls attention, in the *Electrical Review*, to a similar investigation carried out by him in 1895, using a continuous current.

THE first volume is announced of the new "Flora of the Pyrenees," by the late P. Bubani, edited by Prof. Penzig, of Genoa. It is published by Hoepli, of Milan, and will be followed by three other volumes.

AN amusing instance of the want of observation of the commonest phenomena of nature has come under our notice in a schedule of the "Language of Flowers" issued by a well-known firm of perfumers. The symbol for "assiduous to please" is "sprig of ivy with tendrils"!

DR. A. WAGNER, of Neuhaus am Inn, Bavaria, issues a list of fifty microphotographs at 1 m. and 1 m. 50 each, a reduction on a quantity. The subjects are entirely botanical, and include sections and microscopic organs of Phanerogams and Cryptogams.

DURING February the following science lectures will be given at the Royal Victoria Hall:—February 1, "Insects in a London Back Garden," Mr. F. Enoch. February 8, "The Problem of the Great African Lakes," Mr. J. E. S. Moore. February 15, "Brains," Mr. Hugh de Haviland.

MR. S. B. J. SKERTCHLY has a note, in the "Geological Survey of Queensland," on a plant which he calls the "copper plant," *Polycarpæa spirostyles*, belonging to the Caryophyllaceæ. He finds it always associated with copper lodes, and thinks it may be of use, on this account, from a practical point of view. Analysis shows the ash to contain an appreciable amount of copper.

DR. C. E. BESSEY republishes, in a separate form, his address as retiring president of the Botanical Society of America, entitled "The Phylogeny and Taxonomy of Angiosperms." A modification, to a not very large extent, is proposed of the systems of De Candolle and of Eichler and Prantl, by which it is thought that the phylogenetic relationships of the orders of Monocotyledons and Dicotyledons are more completely indicated.

WE have received the first three numbers of a new serial, the *Circular* of the Royal Botanic Gardens, Ceylon, intended to deal with agricultural, horticultural, and botanical topics, with special reference to the work carried on in the Botanic Garden. The chief subject treated in these numbers is the canker of the cacao tree, its cause, and the possible remedies, including a correspondence on the subject with the authorities at Kew.

MR. J. H. HART, the Superintendent of the Royal Botanic Garden, Trinidad, has commenced, in the *Bulletin of Miscellaneous Information*, the publication of a monograph of the Ferns of the British West Indies and Guiana, prepared by Mr. G. S. Jenman. Vol. iv. part 5 of the *Bulletin*, for January 1898, is entirely occupied by the two genera *Hymenophyllum* and *Trichomanes*, twenty-nine species being described of the former, and forty-two of the latter genus.

A LEAFLET on "The Advantages of Boiling Drinking Water and Milk" has just been published by the National Health Society. It is written by Mrs. Percy Frankland, and is intended for distribution amongst both rich and poor. It contains a brief account of the dangers which may attend the use of contaminated water and milk, and a few simple instructions are given for ensuring the removal of any noxious germs which may be present by the efficient boiling of these liquids. Copies for distribution may be obtained of the Secretary of the Society, 53 Berners Street, London, W.

THE additions to the Zoological Society's Gardens during the past week include a Mozambique Monkey (*Cercopithecus pygerythrus*) from South-East Africa, presented by Miss Rogers; a Smooth-headed Capuchin (*Cebus monachus*) from South-east Brazil, presented by Mr. W. S. Jay; a Chinese Goose (*Anser cygnoides*) from China, presented by the Rev. E. Hensley; a Beccaris Cassowary (*Casuarius beccarii*) from New Guinea, deposited.

IN the notice of Mr. Dodgson, the words "symbolically developing and popularising" should be inserted before "the study" in the seventh line from the end (p. 280).

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN FEBRUARY:—

Feb. 3.	18h. 43m. to 19h. 10m. δ Geminorum (mag. 3·7) occulted by the moon.
5.	17h. 34m. Near approach of ο′ Cancri to the moon.
6.	Pallas 1° N. of τ Eridani.
9.	10h. 13m. Minimum of β Persei (Algol).
11.	6h. Mercury 1′ N. of Mars.
11.	17h. 26m. to 17h. 54m. 89 Virginis (mag. 5·2) occulted by the moon.
12.	7h. 2m. Minimum of β Persei (Algol).
13.	19h. 33m. to 20h. 37m. *b* Scorpii (mag. 4·8) occulted by the moon.
14.	10h. 23m. Moon in conjunction with α Scorpii (Antares).
14.	Illuminated portion of Venus = 1·000.
	,, ,, Mars = 0·981.
14.	17h. Saturn in conjunction with moon. Saturn 5° 30′ N.
15.	Venus 1½° S. of the sun.
23.	8h. 52m. to 9h. 11m. Jupiter with only one visible satellite.

THEORY OF PERIODIC COMETS.—We have already called attention in this column (September 16, p. 473) to the recent work of M. Callandreau on the subject of disaggregation of cometary matter, and pointed out the lines he has followed in his research. In the *Annales de l'Observatoire de Paris, Memoires*, t. xxiii., he has collected the results of his recent work, and examined to what extent the theory is supported by recent observations. The circumstances favourable for disruption are—close approach to Jupiter, small relative velocity, and small excentricity of orbit. The question is, therefore, to what extent do the elements of comets which have given evidence of disintegration exhibit these peculiarities. It must be remembered, that it is only since the comet of 1882 was seen to be accompanied by faint nebulous matter that the neighbourhood of a comet has been regularly explored to detect the presence of companions. The most typical case yet noticed is that of the comet of 1889 V., which was very numerously attended, and of which it has been established that the orbit of at least one of the companions cuts the orbit of the principal comet near its aphelion. Since this comet, as Chandler has shown, made an approach to Jupiter in 1886, it seems likely that the disruption took place then, owing to the influence of that planet, since the conditions indicated as favourable to the theory are all present in this instance. The existence of the two distinct comets of Wolf and Barnard (1892 V.) can with probability be traced to the action of Jupiter, but the epoch at which the approach to the planet occurred cannot be decided.

The famous instance of Biela is inconclusive. A general investigation of the distance between the two nuclei shows that this is greatest about perihelion, and least at, or near, aphelion. The difficulty of identifying the two nuclei led Prof. Hubbard to make two hypotheses in his calculations, and he preferred that which gave the minimum distance between the two nuclei. But M. Callandreau shows that adopting the second hypothesis, which, though rejected by Hubbard, is by no means excluded by the result of his researches, the division of the comet into two parts would take place in Heliocentric Longitude 266°, while the longitude of the point of closest approach of the orbit of Jupiter and the comet is 268°.

The suggestion that a family of comets with aphelia near the orbit of Jupiter and with periods approximately half that of the planet, should be introduced into the solar system by the action of Jupiter, is not without its objections, based on the theory of probabilities; but the multiplication of comets by disruption is free from this objection, and would also tend to explain the faintness which is a feature of this class of comets.

PHOTOGRAPHIC MAGNITUDES.—In *Circular* No. 22, issued from the Harvard College Observatory by Prof. Pickering, the question of photographic magnitudes of stars is considered. It is pointed out that it is a matter of great importance to know how much the relative brightness of star images will vary on different plates, or on different portions of the same plate. It is especially important to determine the amount of this error, since it is not easily eliminated and has been supposed to be large by some persons not familiar with stellar photographs. A moment's investigation of photographs of the same portion of the sky shows that this source of error is small, so small